

## **DRAFT**

### **ENGINEERING EVALUATION REPORT**

<b>Plant Name:</b>	<b>VERIZON WIRELESS - MCLAUGHLIN/BACCHUS</b>
<b>Application Number:</b>	<b>11555</b>
<b>Plant Number:</b>	<b>16736</b>

#### **Background:**

The applicant is applying for an Authority to Construct for a new Emergency Stand-By Diesel Power Generator. The applicant is requesting an Authority to Construct for the following equipment:

#### **S-1 Emergency Stand-By Diesel Generator; Generac/John Deere Model 5030HF270, 96 BHP**

#### **CUMULATIVE EMISSION CALCULATIONS**

Emission factors for all criteria pollutants except SO<sub>2</sub> were provided by the engine manufacturer. They are as follows:

PM	0.09	g/bhp-hr
NO <sub>x</sub>	4.92	g/bhp-hr
CO	0.01	g/bhp-hr
TOC	0.34	g/bhp-hr
SO <sub>2</sub> *	0.93	g/bhp-hr

The applicant requested operations for 50 hrs/year non-emergency use. This restriction is consistent with the California Air Resources Board Final Regulatory Order 17 CFR 93115, Air Toxic Control Measure for Stationary Compression Ignition Engines (December 4, 2004). The ATCM restricts operation of stationary emergency standby engines with diesel pm emission rates of 0.15 g/bhp-hr or less to no more than 50 hr/yr for maintenance and testing purposes see Attachment 1).

At a 50 hour/year testing and maintenance limitation, criteria emissions are as follows:

SOURCE S-1		PM10	NOX	CO	TOC	SO2
	BHP	G/BHP-HR	G/HR	G/HR	G/HR	G/HR
g/bhp-hr unabated	96	0.090	4.920	0.100	0.340	0.940
TOTAL LB/HR		0.02	1.04	0.02	0.07	0.20
LB/MGAL		3.66	200.24	4.07	13.84	38.26
TOTAL LB/DAY		0.46	24.99	0.51	1.73	4.77
TOTAL LB/50 HRS		0.95	52.06	1.06	3.60	9.95
TOTAL TPY		0.0005	0.026	0.001	0.002	0.005

All emission factors except SO2 from Manufacturer's Specifications

Emission factors for SO2 from AP 42, Chapter 3.3, Table 3.1

## **TOXIC RISK MODELING**

An ISCST3 model for diesel PM10 exposure was run using SJA93 (local) meteorological data. Residential risk is based on a continuous 70-year exposure to annual average pollutant concentrations. Distance and directionality were used as the primary considerations to determine sites of maximum exposure. Both industrial and residential risks were considered in both urban and rural terrain settings.

The proposed generator is within 1000 feet of two schools, Christian Community Academy and Santee Elementary School. Ground level concentrations of PM10 were calculated at the closest outer boundary of each of the schools. For students, the modeling assumptions include an increased breathing rate of approximately 10.5 m<sup>3</sup> per day, and exposures that are for 36 weeks per year over a 9-year period. The projected carcinogenic and non-carcinogenic risk levels at those point was determined to be significantly less than 1 in a million.

The following relationship was used to determine the PM10 exposure risks:

$$\text{Risk} = [\text{Max Annual PM10 Conc } (\mu\text{g}/\text{m}^3)] * [\text{Exposure Factor Adj}] * [\text{Unit Risk } (\mu\text{g}/\text{m}^3)^{-1}]$$

### **PROJECT RISK BASED ON 50 HRS/YEAR OPERATION**

RURAL TERRAIN	Max annual avg ambient conc ( $\mu\text{g}/\text{m}^3$ )	Diesel PM Unit Risk ( $\mu\text{g}/\text{m}^3$ )-1	Diesel PM Chronic REL ( $\mu\text{g}/\text{m}^3$ )	Exposure Factor	Max Cancer Risk/MM	Max Chronic HI
Residential	7.84E-03	3.00E-04	5.00E+00	1	2.35	1.57E-03
Industrial	7.84E-03	3.00E-04	5.00E+00	0.66	1.55	1.57E-03
Christian Academy	5.70E-04	3.00E-04	5.00E+00	0.18	0.03	1.14E-04
Santee School	4.20E-04	3.00E-04	5.00E+00	0.18	0.02	8.40E-05

URBAN TERRAIN	Max annual avg ambient conc ( $\mu\text{g}/\text{m}^3$ )	Diesel PM Unit Risk ( $\mu\text{g}/\text{m}^3$ )-1	Diesel PM Chronic REL ( $\mu\text{g}/\text{m}^3$ )	Exposure Factor	Max Cancer Risk/MM	Max Chronic HI
Residential	7.68E-03	3.00E-04	5.00E+00	1	2.30	1.54E-03
Industrial	7.68E-03	3.00E-04	5.00E+00	0.66	1.52	1.54E-03
Christian Academy	6.00E-04	3.00E-04	5.00E+00	0.18	0.03	1.20E-04
Santee School	3.80E-04	3.00E-04	5.00E+00	0.18	0.02	7.60E-05

The maximum calculated carcinogenic risk is below 10 in a million and the maximum calculated chronic hazard index is less than 1.0, and so the generator as proposed is acceptable under the District's Risk Management Policy.

### **BACT/TBACT REVIEW**

Under Regulation 2, Rule 2, any new source which results in an increase of criteria pollutants must be evaluated for adherence to BACT control technologies. For I.C. engines with compression ignition rates greater than or equal to 175 hp, this means the engines must be fired on "California Diesel Fuel" (fuel oil with less than 0.05% by weight sulfur content, and less than 20% by volume aromatic hydrocarbons). BACT requires that the engines emit no more than 6.9 g/bhp-hr of NOx. TBACT requires that the engines emit no more than 0.1 g/bhp-hr of PM10. The diesel engine proposed for this facility meets BACT and TBACT requirements

Toxic emission were calculated using emission factors from AP-42, Section 3-1. None of the identified pollutants exceeded the District's Toxic Trigger Levels. A summary of the toxic screening levels for the engines is summarized in Attachment 2.

### **Compliance Determination:**

This generator is covered under ministerial exemption, Chapter 2.3 of the BAAQMD Permit Handbook. CEQA is not triggered for emergency stand-by generators under this provision.

This generator is also governed by District **Regulation 9, Rule 8**, "Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines." The explicit annual equipment usage limitation of 50 hours per year except for operation under emergency conditions (Reg 9-8-330) will be included as part of the permit conditions.

Visible emissions will be required to meet Ringelmann 1.0 limitation per **Regulation 6**.

Sulfur emissions will be controlled by the requirement that any fuel used in the engine meet California Clean Air fuel content of 0.05% bw sulfur, per **Regulation 9-1**.

This is a new source, and no sources are proposed to be closed in connection with this application. The facility currently emits approximately 0.03 TPY of criteria pollutants (including the emissions from this application). No single source emits more than 1 TPY of PM10 or SO2 or 15 TPY of POC or nitrogen oxides. Therefore, the facility is not subject to emission offset requirements under Regulation 2-2-302 or 2-2-303.

### **Conditions:**

Condition #22028, setting out the operating conditions and recordkeeping requirements for operations at Source S-1 shall be made part of the source's authority to construct/permit to operate.

**Recommendation:**

I recommend that an Authority to Construct be issued for the following source:

**S-1      Emergency Stand-By Diesel Generator, Generac/John Deere Model  
5030HF270, 96 BHP**

subject to Condition #22028.

By Catherine Fortney      Date 3/16/05  
*PSD Evaluator*

COND# 22028 -----

1. Emergency stand-by generator S-1 shall be fueled exclusively by diesel fuel having a sulfur content no greater than 0.05% by weight. [Reg 9-1-304]
2. Emergency stand-by generator S-1 shall not exceed the opacity and particulate emissions set out in Regulation 6, "Particulate and Visual Emissions". [Reg 6]
3. Emergency stand-by generator S-1 shall only be operated to mitigate emergency conditions or for reliability-related operations. Operations for reliability-related activities shall be limited to 50 hours per generator in any consecutive 12-month period. Operation while mitigating emergency conditions is unlimited. [Reg 9-8-330]
4. Emergency conditions are defined as any of the following:
  - a. Loss of regular natural gas supply
  - b. Failure of regular power supply
  - c. Flood mitigation
  - d. Sewage overflow mitigation
  - e. Fire
  - f. Failure of a primary motor, but only for such time as needed to repair or replace the primary motor [Reg 9-8-231]
5. Reliability-related activities are defined as any of the following:
  - a. Operation of an emergency stand-by engine to test its ability to perform for an emergency use
  - b. Operation of an emergency stand-by engine during maintenance of a primary motor [Reg 9-8-232]
6. The emergency stand-by engine shall be equipped with a non-resettable totalizing meter that measures and records the hours of operation for the engine. [Reg 9-8-530]
7. The following monthly records shall be maintained in a District-approved log for at least 2 years and shall be made available to the District upon request:
  - a. Total hours of operation for each generator
  - b. Total hours of operation under emergency conditions for each generator, and a description of the nature of the emergency condition
  - c. Total fuel usage for each generator [Reg 9-8-530]

## ATTACHMENT 1

### FINAL REGULATION ORDER

#### AIRBORNE TOXIC CONTROL MEASURE FOR STATIONARY COMPRESSION IGNITION ENGINES

(DECEMBER 4, 2004)

TABLE 1: SUMMARY OF THE EMISSION STANDARDS AND OPERATING REQUIREMENTS FOR NEW STATIONARY EMERGENCY STANDBY DIESEL-FUELED CI ENGINES > 50 BHP (SEE SUBSECTION (e)(2)(A)3.)				
DIESEL PM				OTHER POLLUTANTS
DIESEL PM STANDARDS (g/bhp-hr)	MAXIMUM ALLOWABLE ANNUAL HOURS OF OPERATION FOR ENGINES MEETING DIESEL PM STANDARDS			HC, NOx, NMHC+NOx, AND CO STANDARDS (g/bhp-hr)
	Emergency Use	Non-Emergency Use		
		Emission Testing to show compliance <sup>2</sup>	Maintenance & Testing (hours/year)	
≤0.15 <sup>1</sup>	Not Limited by ATCM <sup>3</sup>	Not Limited by ATCM <sup>3</sup>	50	Off-Road CI Engine Certification Standards for an off-road engine of the same model year and horsepower rating, or Tier 1 standards for an off-road engine of the same maximum rated power. <sup>4</sup>

1. Or off-road certification standard (title 13 CCR section 2423) for an off-road engine with the same maximum rated power, whichever is more stringent
2. Emission testing limited to testing to show compliance with subsections (e)(2)(A)3.
3. May be subject to emission or operational restrictions as defined in current applicable district rules, regulations, or policies.
4. The option to comply with the Tier 1 standards is available only if no off-road engine certification standards have been established for an off-road engine of the same model year and maximum rated power as the new stationary emergency standby diesel-fueled CI engine.

## ATTACHMENT 2

A#11555 - VERIZON WIRELESS

Small Generator Emissions

Engine Size =	96 BHP	
Hourly Diesel Usage =	5.2 GPH	
Hourly Diesel Usage =	0.005 MGAL/HR	
Annual Diesel Usage =	0.260 MGAL/YR	at 50 hrs/yr maintenance & testing
=	36.40 MMBTU/YR	

POLL	POLL NAME	CAS	BAAQMD Trigger (lb/yr)	Emission Factor (lb/MM BTU)	TOTAL EMS (lb/yr)	EMS > TRIGGER LEVEL ?
41	Benzene	71-43-2	6.7	9.33E-04	0.03	NO
60	Carbon tetrachloride	56-23-5	4.6			
124	Formaldehyde	50-00-0	33	1.18E-03	0.04	NO
148	Hexane	110-54-3	39000			
179	Methyl alcohol	67-56-1	120000			
182	1,1,2-trichloroethane	79-00-5	12			
263	Styrene	100-42-5	135000			
293	Toluene	108-88-3	38600	4.09E-04	0.01	NO
307	Xylene	1330-20-7	57900	2.85E-04	0.01	NO
314	1,1-Dichloroethane	75-34-3	120			
333	Ethyl benzene	100-41-4	190000			
335	Acetaldehyde	75-07-0	72	7.67E-04	0.03	NO
386	Naphthalene	91-20-3	270	8.48E-05	0.00	NO
390	Chloroform	67-66-3	36			
396	Methylene chloride	75-09-2	190			
420	Ethylene dibromide	106-93-4	2.7			
512	Acrolein	107-02-8	3.9	9.25E-05	0.00	NO
518	Vinyl chloride	75-01-4	2.5			
520	Chlorobenzene	108-90-7	13500			
521	1,3-butadiene	106-99-0	1.1	3.91E-05	0.00	NO
781	1,1,2,2-tetrachloroethane	79-34-5	3.3			
1030	Arsenic	7440-38-2	0.024			
1040	Beryllium	7440-41-7	0.015			
1070	Cadmium	7440-43-9	0.046			
1110	Copper	7440-50-8	463			
1140	Lead	7439-92-1	29			
1160	Manganese	7439-96-5	77			
1190	Mercury	7439-97-6	57.9			
1180	Nickel	7440-02-0	0.73			
1220	Selenium	7782-49-2	96.5			
1320	Zinc	7440-66-6	6760			
1860	PAH (benzo[a]pyrene equiv)		0.043	1.68E-04	0.01	NO

Toxic Emission Factors From AP-42, Chapter 3.3, "Speciated Organic Compound Emission Factors for  
for Uncontrolled Diesel Engines," October 1996